

CLAIMS

We claim:

1. A purification device comprising:
a purification chamber; and
5 at least one LED that produces ultraviolet light wherein the at least one LED is
arranged to irradiate the inside of the chamber.
2. The device of claim 1 wherein the chamber is arranged to contain at least one of vapor
and liquid.
- 10 3. The device of claim 1 wherein the at least one LED is positioned within the chamber.
4. The device of claim 1 wherein the chamber further comprises a material that allows
for the transmission of ultraviolet light.
- 15 5. The device of claim 4 wherein the at least one LED is arranged to irradiate the inside
of the chamber through the material.
6. The device of claim 1 further comprising a handheld housing wherein the at least one
20 LED and chamber are substantially enclosed.
7. A handheld device comprising:
a handheld housing; and
at least one LED that produces ultraviolet light wherein the at least one LED is
25 arranged to irradiate from the housing.
8. The device of claim 7 wherein the handheld housing is arranged for use as an
inspection light.
- 30 9. The device of claim 7 wherein the handheld housing is arranged for use as a portable
purification device.

10. The device of claim 1 or 7 further comprising:
a processor for controlling the at least one LED.
- 5 11. The device of claim 10 further comprising:
at least one second LED wherein the second LED produces at least one of visible light
and infrared light.
12. The device of claim 11 wherein the processor independently controls the at least one
10 LED and the at least one second LED.
13. The device of claim 10, further comprising a sensor, wherein the sensor is associated
with the processor and the processor controls the output of the at least one LED in response to
the sensor.
- 15 14. The device of claim 1 or 7, further comprising a user interface that adjusts the output
of the at least one LED.
15. The device of claim 14, wherein the user interface is associated with a processor and
20 the processor controls the output of the at least one LED in response to the user interface.
16. The device of claim 15, wherein the processor controls the at least one LED with
pulse width modulated control signals.
- 25 17. The device of claim 15, wherein the processor controls the at least one LED with at
least one of voltage amplitude control and current amplitude control.
18. The device of claim 1 further comprising:
a filter wherein the filter is inside the chamber and the at least one LED is arranged to
30 irradiate the filter.

19. The device of claim 18 wherein the filter is an air filter.

20. An insect light comprising:

at least one of an ultraviolet light producing LED and a blue light producing LED for
5 attracting insects; and at least one of an insect trap and insect killing device.

21. The light of claim 20 further comprising:

at least one second LED wherein the at least one second LED produces at least one of
visible light and infrared light.

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22. The light of claim 21 further comprising:

a processor wherein the processor controls at least one of the ultraviolet LED and at
least one second LED.

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23. A method of purifying comprising the steps of:

providing at least one LED that produces ultraviolet light;
providing a chamber for containing at least one of a liquid and a vapor; and
irradiating the interior of the chamber with the at least one LED.

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24. The method of claim 23 further comprising:

providing a sensor wherein the sensor is associated with a processor and the processor
varies the output of the at least one LED in response to a signal provided by the sensor.

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25. The method of claim 23 further comprising:

providing a filter within the chamber wherein the at least one ultraviolet LED is
arranged to irradiate the filter.

26. A method of purifying a surface comprising:

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providing a handheld housing;

providing at least one LED that produces ultraviolet light wherein the at least one
ultraviolet LED is associated with the housing and arranged to irradiate from the housing; and

having a user hold the housing and irradiate a surface to be purified.

27. A method of irradiating an object with ultraviolet light comprising:
providing a handheld housing;
5 providing at least one LED that produces ultraviolet light wherein the at least one LED is associated with the housing and arranged to irradiate from the housing; and
having a user hold the housing and irradiate an object.

28. The method of claim 27 wherein the object has fluorescent properties.

29. The method of claim 27 wherein the object is at least one of human tissue and human skin.

30. The method of claim 23, 26, or 27, further comprising:
15 providing a processor that controls the at least one LED.

31. The method of claim 30, further comprising at least one visible LED that generates visible light, wherein the processor also controls the at least one visible LED.

32. The method of claim 23, 26, or 27, further comprising a user interface to vary the output of the at least one LED that produces ultraviolet light.

33. The method of claim 32, wherein the user interface is associated with a processor and the processor controls the output of the at least one LED that produces ultraviolet light in
25 response to the user interface.

34. An illumination device, comprising:
at least one visible LED that generates visible light;
at least one ultraviolet LED that generates ultraviolet light;
30 a processor that independently controls the at least one visible LED and the at least one ultraviolet LED; and

a housing wherein the LEDs are housed and arranged to irradiate from the housing.

35. The device of claim 34, wherein the at least one visible LED comprises at least two different colored LEDs.

36. The device of claim 35 wherein the at least one visible LED comprises at least the colors red, green and blue.

37. The device of claim 34 wherein the processor is a network addressable controller.

38. A method of irradiating a display comprising:
providing a display;
providing a plurality of ultraviolet LEDs that generate ultraviolet light; and
irradiating the display with the ultraviolet LEDs.

39. The method of claim 38, further comprising:
providing a plurality of visible LEDs; and
providing a processor that independently controls the plurality of visible LEDs and the plurality of ultraviolet LEDs.

40. The method of claim 39, wherein the processor is a network addressable controller.

41. The method of claim 39, wherein the display comprises at least one of a retail display, sign, advertisement, logo, picture, graphical image, and poster.

42. The method of claim 39, wherein the processor is directed to vary the intensity of the plurality of visible LEDs and the plurality of ultraviolet LEDs over time to produce apparently changing effects in the display.

43. A method of impacting the growth of plants comprising:
providing at least one ultraviolet LED;

providing at least one visible LED;

providing a processor that independently controls the at least one ultraviolet LED and the at least one visible LED;

directing the at least one ultraviolet LED and the at least one visible LED to irradiate a
5 plant; and

causing the processor to vary the output of the LEDs over a period of time.

44. The method of claim 43, wherein the step of varying the output of the LEDs over a period of time simulates outdoor conditions over a period of time.

45. The method of claim 43, wherein the at least one visible LED comprises at least two different colored LEDs and the processor also independently controls the at least two different colored LEDs.

46. The method of claim 43, further comprising at least one infrared producing LED, and wherein the processor also controls the at least one infrared LED.

47. The method of claim 43, wherein the processor comprises a network addressable controller.

48. The method of claim 43, wherein the growth of the plant is enhanced.